extent appropriate in order to overcome this new ground of rejection, and so withdrawal of the finality of the rejection is proper.

REMARKS

Applicant concurrently files herewith a petition and fee for a three-month extension of time.

Entry of this Amendment is proper because it narrows the issues on appeal and does not require further search by the Examiner. Claim 1 has been amended editorially, if anything broadening the claim. Claim 8 has been amended by adding to it the subject matter of its dependent claim 9, and claim 14 has been amended by adding to it the subject matter of its dependent claim 15. Thus, no new issues are presented by this Amendment, and its entry, either for allowance or for appeal, is in order at this time, whether the finality of the Office Action is withdrawn or not.

SUMMARY

Claims 1-8, 11-14 and 17-24 are presently pending in the application. Claims 1, 8 and 14 have been amended to more particularly define the invention. Claims 9 and 15 have been cancelled in the interest of expediting prosecution.

Claims 1-2, 8-9, 14-15 and 21-24 were rejected under 35 U.S.C. §102(b) as being anticipated by Pennock, U.S. Patent No. 4,885,517. Claims 3-5, 12-13 and 18-20 were rejected under 35 U.S.C. §103(a) as being unpatentable over Pennock in view of Smith, et al., U.S. Patent No. 6,546,456 and claims 6, 7, 11 and 17 were rejected under U.S.C. §103(a) as being unpatentable over Pennock and Smith, et al., further in view of Kao, U.S. Patent No.

5,374,933. These rejections are respectfully traversed.

THE CLAIMED INVENTION

The claimed invention is directed to a disk drive apparatus and to a method of controlling a head drive section of a disk drive apparatus. In accordance with an exemplary embodiment of the invention, under a power voltage of a level equal to or smaller than a predetermined rating level, the disk drive apparatus controls a head drive section to position a head in a radial direction of an information recording disk and to carry out a write and/or read operation of information, while rotatively driving the information recording disk by means of a rotation drive motor.

The disk drive apparatus includes a forcible restoring section for controlling the head drive section to forcibly bring the head to a retract position when the power voltage goes below a first voltage level smaller than the rating level. A normal restoring section controls the head drive section to move the head toward the retract position on the basis of the power voltage when the power voltage goes below a second voltage level smaller than the rating level but greater than the first voltage level.

It is to be noted that a single supply voltage -- the power voltage -- is monitored, and that two different actions take place under two different conditions, namely: (1) In the event the power voltage goes below a first voltage level, smaller than the rating level, the head is forcibly brought to the retract position. (2) In the event the power voltage goes below a second voltage level, smaller than the rating level, but greater than the first voltage level, the head is moved toward the retract position on the basis of the power voltage.

Another exemplary embodiment of Applicants' invention includes a rotation drive

motor for rotating an information recording disk; a read/write head for reading and writing information on the information recording disk; a head drive motor for driving the head over the information recording disk; a voltage input for providing voltage to the rotation drive motor and to the head drive motor; a voltage value monitor for monitoring the value of the voltage provided by the voltage input; and a controller, responsive to the monitored voltage value being above a first predetermined level, for providing voltage from the voltage input to the rotation drive motor to rotate the information recording disk and to the head drive motor to drive the head in a first direction. The controller is responsive to the monitored voltage value being equal to or less than the first predetermined level and above a second predetermined level for providing voltage from the voltage input to the head drive motor to drive the head toward the periphery of the information recording disk. The controller is further responsive to the monitored voltage value being equal to or less than the second predetermined level for providing reverse electromotive force from the rotation drive motor to the head drive motor to drive the head to the periphery of the information recording disk.

In each embodiment of Applicants' invention, three levels of the input or power voltage are of concern. In independent claims 1, 22, and 23, these are a voltage of a rating voltage level, a voltage of a first voltage level smaller than the rating level, and a voltage of a second voltage level smaller than the rating level, but greater than the first voltage level. In independent claims 8, 14, and 24, these are voltage above a first predetermined level, a voltage equal to or less than the first predetermined level and above a second predetermined level, and voltage equal to or less than the second predetermined level.

In each embodiment, it is a single voltage that is monitored, referred to as an input voltage or a supply voltage.

THE PRIOR ART REFERENCES

The Pennock Reference

Pennock discloses a voice coil actuator positioning amplifier utilizing two voltages of two separate voltage levels -- Vcc and 5V. In the event either of the two voltages goes below a single reference level, an actuator mechanism is brought to a retract position.

The Smith Reference

Smith discloses a method and apparatus for operating a vehicle mounted disk drive storage device. There is no disclosure or suggestion of action taking place dependent upon which one of three input voltage levels is present.

The Kao Reference

Kao discloses a vehicle navigation system. There is no disclosure or suggestion of action taking place dependent upon which one of three possible input voltage levels is present.

ARGUMENT

The Office Action rejects the claims with the contention that Pennock discloses (1) a forcible restoring section for controlling a head drive section to forcibly bring the head to a retract position when the power voltage goes below a first voltage level smaller than a rating level, and (2) a normal restoring section for controlling the head drive section to move the

head toward the retract position on the basis of the power supply voltage when the power voltage goes below a second voltage level smaller than the rating level but greater than the first voltage level. The rejection based on this contention is traversed.

As to (1), a forcible restoring section for controlling a head drive section to forcibly bring the head to a retract position when the power voltage goes below a first voltage level smaller than a rating level, the Office Action cites Pennock at column 2, lines 22-42, with the comment that there Pennock describes comparison of the supply voltage with a set voltage, with head retraction when the supply voltage is smaller or below the set voltage. *Assuming that to be correct*, still, there is no showing or suggestion of forcibly bringing the head to the retract position.

Even more, there is no showing or suggestion of providing reverse electromotive force from the rotation drive motor to the head drive motor to drive the head to the retracted position.

As to (2), a normal restoring section for controlling the head drive section to move the head toward the retract position on the basis of the power supply voltage when the power voltage goes below a second voltage level smaller than the rating level but greater than the first voltage level, the Office Action cites Pennock at column 9, lines 7-16, with the comment that there Pennock describes two voltage level conditions for retraction, with one voltage level that is higher than the other voltage level. This comment is incorrect. That passage reads:

> "Clamping diodes 601 and 602 are connecting the load coil 36 to the positive side of the voltage supply. The diodes 601 and 602 are present because they are required during normal operation in order to protect the

> output stages devices from transient conditions which would otherwise damage them. The presence of two diodes 601 and 602 ensures that the voltage level at the load 36 is not held too low in the circumstances where the voltage supply is not at its nominal value or has been lost, that is, zero."

That passage of Pennock describes the use of clamping diodes 601 and 602 of Pennock's retract circuit, shown in his Figure 6, to protect against damage from transient conditions. The two diodes 601 and 602 are not used to provide two distinct voltage levels; the voltage across the serially connected diodes ensures that the voltage level at the load is not too low..

Lines 17-44 of column 9 of Pennock relate to his undervoltage protection circuit shown in his Figure 7. That portion of Pennock reads:

> "On activation by a signal on the RETR input port 109 [Figure 1], a controlled unidirectional current is applied across the voice coil load 32. In a typical application this will impose a unidirectional force or torque on the actuator mechanism, causing it to move to one limit of its mechanical travel. Since the current used is supplied from the separately derived VRETR supply 112, this action will occur independently of the mode of power-down of the VCC supply 111. FIG. 7 illustrates the undervoltage detection arrangements for the signal amplifier. Sample values of the voltage supplies being monitored are obtained by the potential divider chains 705-706 connected in series between Vcc (111) and ground, and 708-709 connected in series between 5 V (110) and ground, respectively, and compared with a reference voltage by means of the comparator comprising the transistors 702, 704, and 707, and the current source 701 and 703. An undervoltage condition for one or both of the supply voltages gives rise to an internal $\overline{\text{RETR}}$ signal which switches off the output stage of the signal amplifier. The undervoltage detection arrangements include significant hysteresis in order to prevent reactivation of the output stages when the supply voltage deviates from the detection threshold by small amounts during undervoltage conditions. The existence of undervoltage conditions also give rise to a $\overline{\text{RETR}}$ signal, as will be evident from FIG. 1, to bring into operation the circuit represented by FIG. 6." (Emphasis added)

This does not describe forcibly bringing the head to a retract position when the power

voltage goes below a first voltage level smaller than a rating level, and moving the head toward the retract position on the basis of the power supply voltage when the power voltage goes below a second voltage level smaller than the rating level but greater than the first voltage level.

The passage states that moving the actuator mechanism to one limit of its mechanical travel (which might be a retract position) will occur independently of the mode of power-down. Thus, whether the power voltage goes below a first voltage level smaller than a rating level, or the power voltage goes below a second voltage level smaller than the rating level but greater than the first voltage level, the same movement of the actuator mechanism takes place.

The passage indicates that the Vcc voltage and the 5V voltage are compared with "a reference voltage," shown in Pennock's Figure 7 as "Vref." This clearly indicates a single reference voltage, thus showing that a single voltage level is the basis for comparison, not a first voltage level and a second voltage level greater than the first voltage level.

It is accordingly submitted that Pennock does not teach or suggest the claimed invention.

Neither Smith nor Kao provides that which distinguishes the claimed invention from Pennock.

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CONCLUSION

In view of the foregoing, Applicant submits that claims 1-8, 11-14 and 17-24, all the claims presently pending in the application, are patentably distinct over the prior art of record and are allowable, and that the application is in condition for allowance. Such action would be appreciated.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned attorney at the local telephone number listed below to discuss any other changes deemed necessary for allowance in a telephonic or personal interview.

To the extent necessary, Applicant petitions for an extension of time under 37 CFR §1.136. The Commissioner is authorized to charge any deficiency in fees, including extension of time fees, or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Respectfully Submitted,

Date: April 12, 2005

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Claim 1 as Amended in the Amendment of June 16, 2004

1. (Currently amended) A disk drive apparatus for controlling, under supply of a power voltage of a level equal to or smaller than a predetermined rating ~~voltage of power voltage~~ level, a head drive section to position a head in a radial direction of an information recording disk and carry out a write and/or read operation of information while rotatively driving the information recording disk by a rotation drive motor, said disk drive apparatus comprising:

a forcible restoring section for controlling said head drive section to forcibly bring said head to a retract position when said power voltage goes below a first voltage level smaller than said rating level; and

a normal restoring section for controlling said head drive section to move said head toward said retract position on the basis of said power voltage ~~while~~ when said power voltage ~~is~~ goes below a second voltage level smaller than said rating ~~voltage~~ level but greater than said first voltage level.